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EVALUATION OF THE PINE BUTTERFLY INFESTATION ON THE NEZPERCE NATIONAL FOREST--1972

by

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The pine butterfly, *Neophasia menapia* (Felder and Felder), infestation on the Nezperce National Forest was aerially surveyed in mid-August 1972. A followup ground evaluation was made in September. Results of the survey show the infestation has increased substantially in intensity and size.

The infestation was first reported in 1971 when 4,200 acres of aerially visible defoliation were detected along the south-facing slopes of the Salmon River breaks east of Riggins, Idaho. Approximately 22,000 acres of defoliation were mapped during the 1972 aerial survey. In addition to the infested areas east of Riggins, defoliation exists as far north as Slate Creek and also on the "island" to the south (Fig. 1).

Defoliation intensities range from just detectable to complete removal of the foliage. Most of the trees still have their 1972 needles.

METHODS

A relationship between the numbers of overwintering pine butterfly eggs and the subsequent defoliation has been established in 1970 and 1971 on the Bitterroot National Forest (Bousfield and Meyer 1972) and modified in 1972 (Bousfield and Dewey 1972). To sample the egg population six 5-inch ponderosa branch tips are collected from midcrown of trees over 20 feet tall. Ten trees are sampled at each collection site. Samples are examined in the laboratory and all butterfly eggs counted. Many of the eggs appear hollow or as though they have been fed upon. These are considered non-viable. The number of viable eggs per 5-inch branch tip can then be used to predict next year's defoliation, using a multiple regression model.

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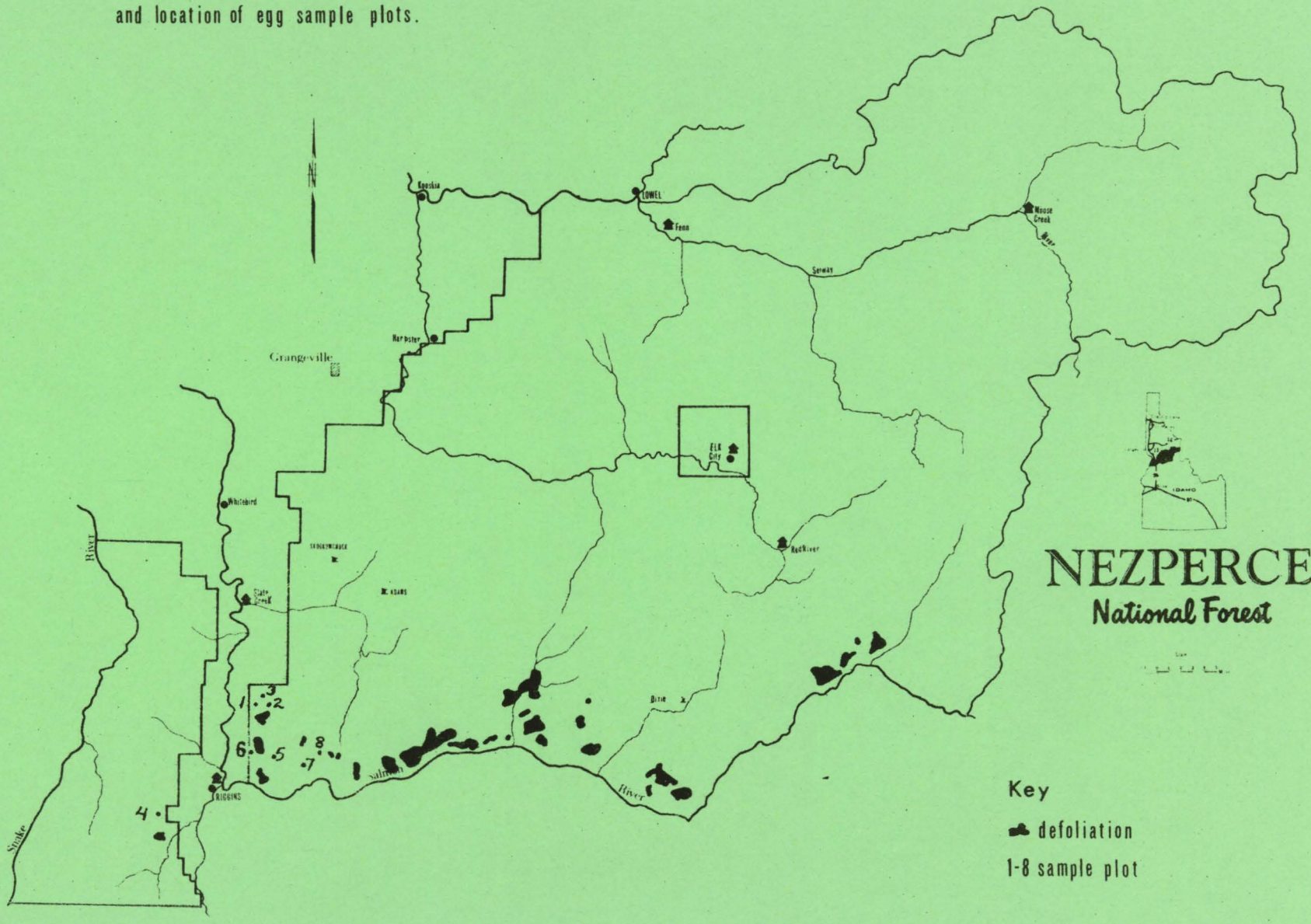
Fig 1 Aerially visable pine butterfly defoliation 1972 and location of egg sample plots.



Egg samples were collected in September from the following locations on the Nezperce National Forest (Fig. 1):

1.	Crawford Creek No. 1	T. 25 N., R. 2 E., sec. 18
2.	Crawford Creek No. 2	T. 25 N., R. 2 E., sec. 17
3.	Crawford Creek No. 3	T. 25 N., R. 2 E., sec. 7
4.	Papoose Creek	T. 24 N., R. 1 W., sec. 35
5.	East Fork of Berg Creek	T. 24 N., R. 2 E., sec. 5
6.	Lightning Creek Saddle	T. 25 N., R. 2 E., sec. 6
7.	Rooney Basin	T. 24 N., R. 2 E., sec. 10
8.	Keating Ridge	T. 25 N., R. 2 E., sec. 36

RESULTS AND DISCUSSION

The average number of viable eggs per 5-inch branch tip and predicted defoliation is shown in Table 1.

Table 1.--Pine butterfly egg counts and predicted defoliation

Plot No.	Area	Viable eggs per 5-inch branch tip	Predicted percent defoliation
1	Crawford Creek No. 1	24.2	54
2	Crawford Creek No. 2	10.2	35
3	Crawford Creek No. 3	67.0	22
4	Papoose Creek	7.0	0
5	East Fork Berg Creek	8.4	25
6	Lightning Creek Saddle	17.9	3
7	Rooney Basin	8.2	0
8	Keating Ridge	23.1	5

Defoliation is determined by a visual estimate of the foliage missing per tree. It is based on the following index:

Negligible defoliation = 0-11 percent
Light defoliation = 12-37 percent
Moderate defoliation = 38-62 percent
Heavy defoliation = 63+ percent

It must be kept in mind that defoliation predictions do not refer to existing defoliation, but what is expected to occur next season. For example, Crawford Creek No. 1 is presently heavily defoliated, but there are only sufficient eggs at this location to cause 54 percent defoliation next year.

In general, it appears that sufficient butterfly eggs exist to cause an increase in the size and intensity of the infestation again in 1973. What this means in predicted tree mortality is speculation. We don't know just how severely ponderosa pine can be defoliated and survive. Available literature indicates that some pines die after a single year of complete defoliation, whereas others can survive up to 3 years of complete defoliation.

Extensive tree mortality has resulted from past pine butterfly outbreaks. Evenden (1940) reports that pine butterfly defoliation caused over 70 percent increment reduction and 26 percent mortality of mature trees during an outbreak near New Meadows, Idaho, in 1922 and 1923. He indicated that many trees did not add basal increment for 1 to 11 years after the infestation. An infestation in the early 1950's on the Boise National Forest was aerially sprayed and controlled. Losses were less than 1 percent tree mortality and a reduction of 39 percent annual increment (Cole 1966).

Pine butterfly defoliation creates an excellent situation for the buildup of bark beetles. However, beetles have not been too much of a problem in past outbreaks. The opportunity for beetle activity is enhanced additionally in the Crawford Creek area due to the logging activity. Slash, stumps, and cull logs were examined in September and much *Ips* sp. activity observed. Beetles emerging next spring from this material pose a threat to the weakened, defoliated trees.

Natural enemies (parasites and predators) have been attributed as causing the collapse of past pine butterfly infestations. Eggs of a predaceous bug of the family Hemiptera, *Apateticus bracteatus* (Fitch), were found frequently during the collecting of the butterfly eggs. It was also apparent from the unemerged pine butterfly pupae that parasitism is also common in the current infestation.

Past infestations have persisted at epidemic levels for about 3 or 4 years before collapsing.

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